



# NASA's Space Launch System: Additive Manufacturing

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**Space Launch System**





# The Journey to Mars

## EARTH RELIANT

MISSION: 6 TO 12 MONTHS  
RETURN TO EARTH: HOURS



Mastering fundamentals  
aboard the International  
Space Station

U.S. companies  
provide access to  
low-Earth orbit

## PROVING GROUND

MISSION: 1 TO 12 MONTHS  
RETURN TO EARTH: DAYS



Expanding capabilities by  
visiting an asteroid redirected  
to a lunar distant retrograde orbit

The next step: traveling beyond low-Earth  
orbit with the Space Launch System  
rocket and Orion spacecraft

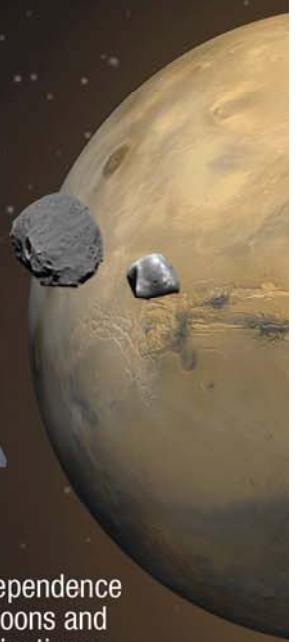


## MARS READY

MISSION: 2 TO 3 YEARS  
RETURN TO EARTH: MONTHS



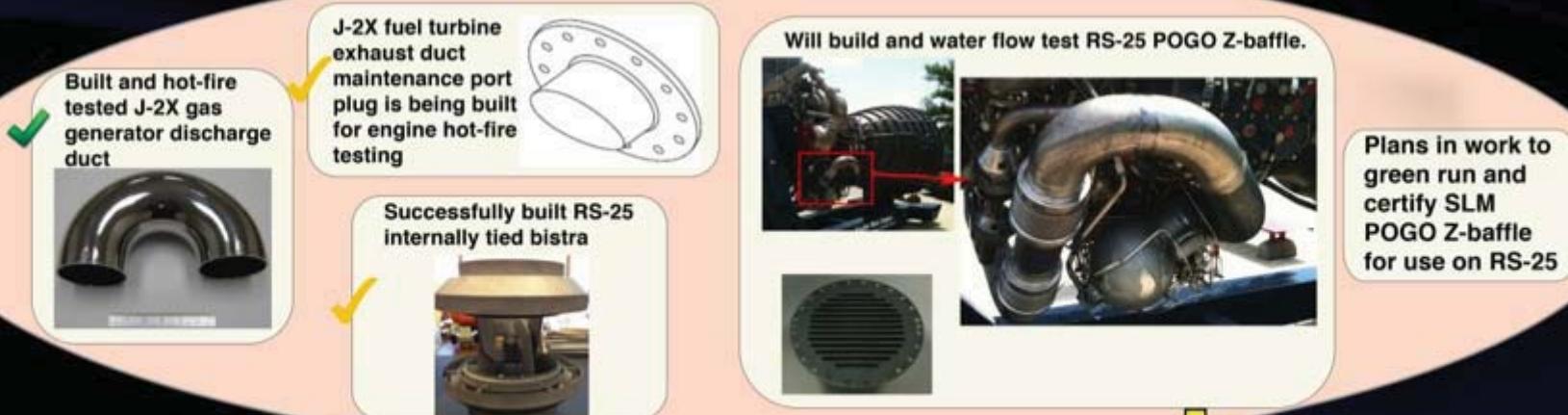
Developing planetary independence  
by exploring Mars, its moons and  
other deep space destinations





# Selective Laser Melting Road to Flight

## Component Development



## Material and Process Development

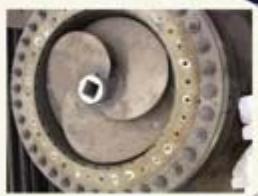
- Created draft SLM Engineering and Quality Guidelines document (Activity Completed)
- Developing inspection techniques (Activity in work)
- Mechanical testing of material samples, developing materials verification matrix (Activity in work)
- Procurement of SLM machine for MSFC Materials Lab (Activity in work)
- Working with Army and Air Force on material development (Activity in work)

Build flight rationale

Fly SLM components in 2017

## Additional MSFC Activities

- Participation in 3 separate proposals for Air Force Broad Agency announcement, pilot Additive Mfg Innovation Institute (Activity in work)
- Engineering Development:
  - Unique tooling fabrication
  - injector elements and various other components for MSFC component test bed
  - Turbopump components
  - Small thruster development



Activity Completed  
Activity in work



# Selective Laser Melting Examples

